Transactions (*continued*).

Tome II. Faune du Calcaire Carbonifère de la Belgique, par L. G. de Koninck (avec un Atlas.) Folio. *Bruxelles* 1877–78. The Museum.

London :—Physical Society. Proceedings. Vol. II. Part V. 8vo. 1879. The Society.

Paris :—Société Francaise de Physique. Séances, Juillet—Décembre 1878. 8vo. The Society.

Trieste :—Società Adriatica di Scienze Naturali. Bollettino. Vol. IV. No. II. 8vo. 1879. The Society.

---

Reports, &c.

London :—Army Medical Department. Report for the year 1877. Vol. XIX. 8vo. 1879. The Department.

Paris :—Bureau des Longitudes. Connaissance des Temps pour l'an 1880. 8vo. 1878. Annuaire. 1879. 12mo. The Bureau.

---

Lœwy (M.) Ephémérides des Étoiles de culmination lunaire et de Longitude pour 1879. 4to. *Paris* 1878. The Author.

—— et F. Perrier. Détermination Télégraphique de la différence de la Longitude entre Paris et l'Observatoire du Depôt de la Guerre à Alger (Colonne Voirol). 4to. *Paris* 1877. The Authors.

—— et — Stephan. Détermination de la Différence des Longitudes entre Paris-Marseille et Alger-Marseille. *Paris* 1878. The Authors.

Siragusa (F. P. C.) L'Anestesia nel Regno Vegetale. 8vo. *Palermo* 1879. The Author.

*April* 3, 1879.

THE PRESIDENT in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

The Right Hon. Richard Assheton Cross, whose certificate had been suspended as required by the Statutes, was balloted for and elected a Fellow of the Society.

Pursuant to notice, Arthur Auwers, Luigi Cremona, Jean Louis

Armand de Quatrefages, Georg Hermann Quincke, Theodor Schwann, and Jean Servais Stas were balloted for and elected Foreign Members of the Society.

The following Papers were read:—

I. "On the Thermal Conductivity of Water." By J. T. Bottomley, Lecturer in Natural Philosophy and Demonstrator in Experimental Physics in the University of Glasgow. Communicated by Professor Sir William Thomson, LL.D., F.R.S. Received March 11, 1879.

(Abstract.)

The experiments described in this paper were undertaken at the instance of Sir William Thomson and by a method devised by him.

The liquid whose thermal conductivity is to be determined is heated from above, to avoid convection currents. Two methods of heating have been used. In one, a horizontal steam chamber is applied at the top of the water or other liquid; and, steam being continuously passed through the heating chamber, the surface of the liquid under experiment is kept at a very high temperature, and heat is conducted from above downwards. In the other method a large quantity of very hot water is deposited on the top of a mass of cold water, mixing being prevented by a simple contrivance; and the heat of this superincumbent layer is conducted downwards through the colder water below.

The experiments have been carried on in very large vessels, or tanks, in order to avoid disturbance by means of loss of heat at the sides. It is intended, at the suggestion of Professor Clerk Maxwell, to observe the loss of heat by the sides under given circumstances, and to estimate, from results of such experiments, the probable error due to this loss.

In the experiments three principal thermometers are employed; together with a fourth, whose object is merely to show when heat begins to be lost at the bottom of the layer of fluid experimented on. When this loss commences the experiment is at an end. The other three thermometers are used thus:—First there is a thermometer with a bulb 30 centims. long. It is placed vertically; and its object is to show the average temperature from top to bottom of the layer of fluid bounded by horizontal planes passing through the top and bottom of its bulb. The rise of this thermometer in any time shows the quantity of heat that has passed into the stratum occupied by it in that time. The other two thermometers are placed with their bulbs horizontal, and one at a known distance vertically above the

other. They indicate the temperatures of the layers in which they are placed.

Now, if we know the difference of temperatures of two sides of a stratum of a liquid during any time, and the quantity of heat conducted across the stratum during that interval of time, we can calculate the thermal conductivity of the liquid by means of a well-known formula.

The result arrived at by the experiments described, is that the thermal conductivity of water may be taken at from ·0022 to ·00245 in square centimetres per second.

Some experiments have been made on the thermal conductivity of solution of sulphate of zinc, a solution which happened to be convenient for preliminary trials. The specific heat of solution of sulphate of zinc at different densities, which it is necessary to know for comparison as to thermal conductivity of that liquid with water, has been determined.

Experiments are now being carried on on this subject with the assistance of a grant from the Government Fund of 4,000*l.*

## II. "The Preparation in a State of Purity of the Group of Metals known as the Platinum Series, and Notes upon the Manufacture of Iridio-Platinum." By GEORGE MATTHEY. Communicated by F. A. ABEL, C.B., F.R.S. Received March 19, 1879.

In this paper it is not my intention, nor should I be able, to refer generally to the results of work in the various branches of platinum metallurgy carried out by my firm, who, as is well known, have been associated with the development of this special field of industry from its earliest infancy; but I shall confine myself simply to that section of it upon which my personal attention has of late years been specifically concentrated in order to meet and comply with the requisition of the Bureau Internationale des Poids et Mesures, the Section Françaises de la Commission Internationale du Mètre, and of l'Association Géodésique Internationale (all of them important scientific committees, formed with the object of arriving at an accurate and definite solution of the long agitated question of standard weights and measures), and also at the demand of the French Minister of War, for an alloy the best adapted for the manufacture of the international metre and kilogram standard, and the geodesique rule; and in my endeavour to solve this difficult problem I have had the great advantage of being able to consult those distinguished men, M.M. Henri Sainte Claire Deville and Henri Debray, of Paris, and have also had the